JPRS 70614

9 February 1978

USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

No. 31

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USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

No. 31

This serial publication contains abstracts of articles and news items from USSR and Eastern Europe scientific and technical journals on the specific subjects reflected in the table of contents.

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I. DEVELOPMENT AND PRODUCTION OF COMPUTERS AND CONTROL EQUIPMENT
B. Problem Areas

USSR

THE DANGER OF "MACHINE LOGIC"

IVOLGIN, G.

[Abstract] Computers are not only instruments which increase the possibilities of man's brain as the telescope did those of his eyes. They are capable of forming an overall picture of reality on the basis of individual characteristics of objects examined and the predetermined meanings of those characteristics. They have a "machine logic." For a "machine" Sherlock Holmes all facts would be equivalent and it would combine them until the whole picture was obtained through the synthesis of facts. A human Sherlock Holmes selects facts requiring explanation and proceeds from the whole to the part, using what is called insight. In working with computers there is the danger that we will start to think in a rigid, programmed manner, that our thinking will be "computerized" and that it will be impossible for us to judge the positions and feelings of other people.

EAST GERMANY

THOUGHTS ON THE RESULTS AND EXPERIENCES GAINED IN THE USE OF ELECTRONIC MINI-
COMPUTERS: EFFECTIVENESS OF THE USE OF MINICOMPUTERS EVALUATED IN A COMPLEX
MANNER

GUSSEK, KARL-DIETHER, professor, Dr of sciences, and TRILLER, WOLFRAM, Plant
Production Section, Martin Luther University, Halle-Wittenberg

[Abstract] The following problems, encountered in the Goerzig-Groebzig-
Woerbzig cooperative in conjunction with the use of minicomputers, are dis-
cussed briefly: (1) Use of an EC 1022 for handling the data of 1200 plant-
growing and 3400 animal-breeding establishments; (2) handling the changes re-
sulting from weather effects on crops both retroactively and for the future;
(3) handling the data resulting from the conversion of the agricultural opera-
tions to an industrial basis; and (4) processing of the data for management-
decision preparation. A start has been made to evaluate the future uses of
computers with the aim of determining the most suitable and practicable equip-
ment to be procured. Emphasis will be on (1) completion of already planned
projects and those already on their way to realization; (2) training of opera-
tors and managers in the operation and use of the computer system; and (3)
conducting research on the algorithms and programs required for effective com-
puter use. Experiences from other fields and agricultural operations in other
countries such as Bulgaria (where the Perevents combine already uses five
C 8205 computers) will be utilized. Figures 2.

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USSR

PROBLEMS WITH IMPLEMENTATION OF "SIGMA" AUTOMATED MANAGEMENT SYSTEM

Moscow SOVETSKAYA ROSSIYA in Russian ("Testing") 12 Jul 77 p 2

BOBKO, I., dr of technical sciences

[Abstract] The article discusses the "Sigma" automated management system (ASU),
successor to the system, based on third-generation computers and developed by
the Institute of Cybernetics, Siberian Department, USSR Academy of Sciences.
A state commission has endorsed "Sigma" for implementation at enterprises of
the machine building and instrument industries which have management systems
based on third-generation computers. According to the author, the system
could be implemented at numerous enterprises without great expense, princi-
pally because of its improved "adaptive" capability or ability to adjust
easily to the specific needs of a given enterprise.

It is suggested, however, that certain problems connected with the implementa-
tion of the system have led to a paradoxical situation. Apparently "Sigma"
has met with opposition from organizations intended to develop and implement
ASU. The system's highly adaptive capability encourages the elimination of
much of the preparatory development work normally required for such systems.
Moreover, enterprises can implement the system unassisted by other agencies.
Because research institutes and design bureaus depend financially upon assist-
ing the enterprises in this way, they may be adversely affected by "Sigma."
The author calls for a change in the relationship between these institutes
and design bureaus and client enterprises.

Two other problems hindering the implementation of "Sigma" are as follows:
Exact standards for the incorporation of subsystems and tasks into systems
are specified by state and industrial-sector standards. However, such rigid
requirements interfere with tailoring the system to the individual needs of
an enterprise. In addition, enterprises implementing "Sigma" often delay
complete implementation when the resolution of certain complex problems is
involved, preferring to let other enterprises solve the problems and so bene-
fit by their experience.

USSR

COMPUTER UTILIZATION IN AZERBAYDZHAN SSR

ALLAKHVERDIYEV, D., corresponding member of the Academy of Sciences Azerbaydzhan SSR, director of the Institute of Cybernetics

[Abstract] The author reviews progress concerning the implementation of computer technology and systems in the economy of the Azerbaydzhan republic and in its scientific and educational institutions. His institute, the Institute of Cybernetics of the Azerbaydzhan SSR Academy of Sciences, works with computer centers and systems divisions of ministries and agencies of the republic.

According to the article, 32.3 percent of the Azerbaydzhan republic's computers are utilized in industrial enterprises, 28.2 percent in higher educational institutions, and 11.3 percent in scientific institutions. Most of the computers in the republic are said to be of medium and low capacity. The first stages of seven automated management systems (ASU) are in operation in the economy. They are capable of solving 146 problems, in addition to which 600 are nearly ready for computer processing. Institutes of the Azerbaydzhan Academy of Sciences use computers to assist research in such fields as economics, chemical engineering, petrochemistry, and physics.

Several areas of concern in the utilization of computers are pointed out. In 1976 the average daily operating time of computers in the Azerbaydzhan SSR was 7.5 hours, compared with the nationwide average of 13 hours. Significant operating time was occupied not with solution of problems but with checking out programs. From the author's point of view, in many ministries and agencies officials do not adequately understand the importance of preliminary analysis and study of processes to which computer technology may be applied, and some workers in computer centers are not provided enough assistance in gathering and formulating data for the solution of economic tasks. An acute shortage of computer operators and programmers exists, a result perhaps in part of VUZ's not training enough specialists for systems analysis, programming and use of economic-mathematical methods. Many who do graduate in these fields require additional training on the job. The article attests that the republic association of users of computers of the Unified System needs a qualified group of specialists for organizing centralized storage of algorithms and programs.

C. Production Plants

USSR

PROGRESS OF CONSTRUCTION AT KIEV COMPUTER PLANT

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ("An Explanation is Demanded")
11 May 77 p 1

TKACHENKO, ZH., correspondent of SOTSIALISTICHESKAYA INDUSTRIYA

[Abstract] The article discusses the expansion of the Kiev Plant of Computers
and Electronic Control Machines. The printed plate shop and waste water
purification station are under construction as planned; however, there have
been delays in construction of the step-down substation, without which the
new sector is inoperable. The question of who will build the substation is
still unresolved, and the article calls for a decision on this matter.

USSR

ISKRA-1255 COMPUTER PRODUCED IN KURSK

Moscow KRASNAYA ZVEZDA in Russian (The Five-Year Plan on the March") 9 Aug
77 p 1

[Text] The first industrial consigment of the Iskra-1255 electronic comput-
ing complex has been turned out at the "Schetmash" Plant in Kursk. They are
intended for the solution of economic and statistical problems in agricul-
tural production and for engineering calculations in during machine design.
This complex may be included in a system of technological monitoring in
plant lines and used at repair facilities of "Sel'khoztekhnika" [Agricultural
Technology] for clarifying causes of hardware malfunctions and in forecasting.
The computer indicates responses via an illuminated status indicator panel,
recordings on magnetic tape, and print-outs on paper tape.

The enterprise has developed five different complexes based on Iskra electron-
ic computers [elektronno-schetnaya mashina].

E. Hardware

INFLUENCE OF KEYBOARD DESIGN ON THE RELIABILITY OF OPERATOR DATA INPUT

YAKEREVICH, R. O., candidate in technical sciences and GRAYFER, R. S., engineer

[Abstract] Keyboard devices are being used today for data preparation and input. This is because of the necessity for investigating factors which influence the reliability of data input and the development of methods to prevent and detect errors of the human operator. This process of operator data input using keyboard devices involves information being given to the operator in a rather simple and clear form and the execution operations being uniquely determined by instruction. The computations made by the authors permit them to conclude that it is feasible to make a broader use of linearly distributed keyboards in data preparation and input devices. They recommend the computation method for designing keyboard control panels in an apparatus for gathering and processing information. Figure 1; tables 2; references 4 (Russian).

STUDY OF ONE VERSION OF HOLOGRAM ASSOCIATIVE MEMORY

GIBIN, I. S., GOFMAN, M. A., KIBIREV, S. F., TVERDOKHLEB, P. YE.

[Translation of Russian Abstract] A hologram associative memory is a portion of an optical memory device with retrieval based on content. A study is made of one version of hologram associative memory with sequential search based on the characters of the request and page-turning processing of information. Input of characters of the request is performed by a deflector, while page turning processing of information for simple and complex search assignments is performed in parallel by an electronic processor with an optical input. An experimental system is described for the search for organic compounds. The estimates presented show that the time required to perform a typical search task in this version of hologram associative memory is two or three orders of magnitude shorter than in magnetic disc computer systems. Figures 9; tables 2; references 3.

USSR   UDC   681.39:681.3.07:621.378.9

OPTICAL MEMORY SYSTEM WITH CONTENT SAMPLING

Novosibirsk AVTOMETRIYA in Russian No 6, Nov/Dec 76 pp 3-14

TVERDOKHLEB, P. YE.

[Translation of Russian abstract] A functional model is described of an op-
tical memory system in which the stage of information output, corresponding
to interrogation, precedes the stage of information address search. The
model is constructed for illustration of the general approach to organiza-
tion of content sampling and explanation of the nature of the transformations
performed in this process of sampling. The possibilities of realization of
this type of sampling by an optical-electronic method are discussed. In
constructing the model, the ideas of the theory of decision making are uti-
lized. Figure 1; references 49.

USSR   UDC   535.317.5:681.325.67

A MULTICHANNEL SEARCH FOR INFORMATION IN NONCOHERENT OPTICAL MEMORY SYSTEMS

Novosibirsk AVTOMETRIYA in Russian No 6, Nov/Dec 76 pp 48-54

GOFMAN, M. A., KIBIREV, S. F., KRIVENKOV, B. YE., TVERDOKHLEB, P. YE., and
CHUGUY, YU. V.

[Abstract] One important property of optical memory devices is the possibili-
ty of multichannel access to the information stored. This work describes the
structure and operating principle of a noncoherent optical memory system pro-
viding for multichannel parallel search for addresses based on several words
of a retrieval request. The system can be used as a high-speed optical memo-
ry catalogue with associative retrieval. The information capacity of such a
system is estimated and results are presented from its experimental investi-
gation on the examples of simple and complex retrieval searches. Figures 3;
references 9.

USSR   UDC   681.327.1:621.383

A SYSTEM FOR READING PAGES OF INFORMATION FOR HOLOGRAPHIC MEMORY UNITS

V'YUKHINA, N. N., KASHCHEYEV, E. L., LUZHETSKAYA, O. A., MANTUSH, T. N., and
PANKOV, B. N., Novosibirsk

[Abstract] A system has been developed for reading pages in a holographic
memory unit by means of an integrated photomatrix for input to an M-400 com-
puter.* The system has been constructed for holographic memory pages measur-
ing 32x32 bits, but can easily be expanded for pages of larger capacity.
Pages are read from buffer memory in a program-controlled transfer mode,
with the words of the page unpacked and introduced by bytes into the M-400
main memory. The buffer memory unit is a microcircuit-based main memory with
a capacity of sixty-four 32-digit words and a maximum access frequency of 1
MHz. The operation of the system is analyzed. Figures 2; references 4:
3 Russian, 1 Western.

*The reading system is used in an experimental holographic memory unit de-
veloped at the IAiE [Institute of Automatic Control and Elektrometry], Si-
berian Department, Academy of Sciences, USSR

POLAND

THE UP-TO-DATE INITIATING ELEMENTS OF COMPUTER KEYBOARDS

BUCZYNSKI, LUDWIK, dr., engineer, Institute for Designing Precision and Optical Instruments, Warsaw Polytechnic

[Translation of Polish Abstract] The principles of operation and examples of design of modern initiating switches for computer keyboards are given. The results of tests conducted and the conclusions concerning the introduction and applications of various types of keyboards are presented. Figures 7; table 1; references 6: 3 Polish, 3 Western.

USSR

DEVELOPMENT OF CRYSTAL-BASED MICROPROCESSORS

KROKHIN, YU.

[Abstract] The article discusses the development of crystal based micropro-
cessors by the State All-Union Central Order of Labor Red Banner Scientific-
Research Institute of Complex Automation.

During a visit to the institute's Laboratory of Telemetering, the author was
shown one of the microprocessors by the head of the laboratory, Ya. Kuper-
shmidt, candidate in technical sciences. For the past 20 years, the insti-
tute's Department of Telemechanics, headed by Dr of Technical Sciences A.
Pshenichnikov, has been working on the development of remote control equip-
ment and the creation of new principles for the design of systems for trans-
mission of production technology data.

During the last Five-Year Plan, work was begun on the development of third-
generation remote control complexes based on integrated circuits, which are
now in wide use. Microprocessors based on one or more crystals will become
the basis of fourth-generation complexes. They make "compression" of data
possible, which causes the flow of information along communication lines to
become denser. Microprocessors are expected to increase the reliability of
automated management systems [ASU] and to eliminate the hazard of loss of in-
formation should the central computer break down.

USSR   UDC 681.3.01

METHOD OF DESIGN OF BUFFER MEMORY FOR A MESSAGE SWITCHING UNIT

ZHOZHIKASHVILI, V. A., BILIK, R. V., BISHNEVSKIY, V. M., and VINARSKIY, M. G.

[Abstract] A study is made of an electronic message switching unit (UKS) with
limited buffer memory for reception, processing and transmission of messages.
The unit consists of a specialized communications processor for a universal
computer with well-developed interfaces for the data transmission channels.
Analysis of the operation of UKS shows that the design of buffer memory
should be based on models of multiphase queueing systems with failures and
blocking. The complete study of such queueing systems is facilitated by
transition to closed networks of exponential-type lines. This, in turn,

allows the maximum memory volume to be estimated. The computational procedures used can be simplified by the use of the equations for phase combination found in this work. Figures 4; references 5: 2 Russian, 3 Western.

USSR

DEVELOPMENT OF A MICROELECTRONIC COMPUTER

Tbilisi ZARYA VOSTOKA in Russian ("Electronic Helpers") 4 Oct 77 p 4

LEZHAVA, I.

[Text] A microelectronic computer based on readjustable homogeneous structures has been created at the "Elva" Scientific Production Association in Tbilisi.

The exterior of the machine brings to mind an ordinary desk calculator. Buttons and indicators are separated by white squares on the illuminated panel.
D. Todua, the deputy director of the association, pushed one button, then another, and instantaneously the ignited tubes indicated the readiness of the computer to solve problems.

"This development is completely original," said our companion. "Because of its compactness, excellent adaption to various controlled systems, and other advantages, the new computer could be used successfully in an automated management system for technological processes [ASUTP] in the most important production units."

The interdepartmental reception commission recommended that the highest quality award be conferred upon the machine. Series production of the new computer will be initiated at the scientific production association's Control Computer Plant.

Series production of another original development by "Elva" has already been mastered: a computer data processing complex, intended for centralized monitoring of technological objectives, primarily in power engineering.

In contrast to the former, this complex occupies considerable space. This is understandable; it gathers information directly from the sensors, then processes it and points out the most practicable solution.

It is fulfilled on a microelectronic base and surpasses, both in reliability and number of control functions, a similar complex based on discrete components which had been produced by the association.

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USSR

REPORT OF NEW SOVIET GENERAL-PURPOSE COMPUTER--4030-1

Kiev PRAVDA UKRAINY in Russian ("New Computers Are Running...We Audit Ful-
fillment of Socialist Pledges") 18 Nov 77 p 2

NARODITSKAYA, L.

[Text] A large contract for the supply of Soviet computers to Czechoslovakia
has been signed in Prague. Before 1980, 25 general-purpose systems will re-
inforce the computer centers of enterprises and scientific-research insti-
tutes of the CSSR [as published]. Prototypes of the machines were developed
at the Kiev Computing and Control Machines Plant (VUM), the leading enter-
prise of the production association "Elektronmash." This is only one fact
of the many-faceted and interesting life of the VUM. Competing for a worthy
welcome of the 60th anniversary of the Great October, the collective of the
entire association achieved an above-plan production output of 1.6 million
rubles. That is how the workers honored the special session of the Supreme
Soviet of the USSR and the adoption of the new Soviet Constitution. During
the period of discussion of the proposed Basic Law for our country, the an-
niversary pledges were reviewed and increased--it was decided to produce an
additional 300,000 rubles' worth of production.

"Kiev computers are valued all over the world," says V. N. Kharitonov, chief
designer of the M4030-1 machine. "Eighteen products of the factory have been
given the state Mark of Quality, among them the M4030 Control Computing Sys-
tem. We decided to develop the new model of the M4030-1 with still higher
productivity and reliability. This is one of the most important points of
the anniversary socialist pledges of the entire collective. It has been suc-
cessfully fulfilled."

"What are the advantages of the new model?"

"Two to 3 times greater productivity with the same equipment configuration.
The model is more economical. The memory capacity of the machine has been
increased four-fold. The system console has been improved. With the aid of
display terminals or teleprinters it is possible to exchange information at
distances of up to 15 kilometers and from 30 different points. This is im-
portant for enterprises, railroad terminals, and airports."

"What scientific-technical innovations helped in fulfilling the anniversary
pledges?"

"An increasing volume of work in the development of electronic computer tech-
nology is being shifted to automatic processes and to electronic machines,
themselves. During the current year alone, two automated technology manage-
ment systems--for the drilling of circuit boards (the basic construction ele-
ment of computers) and the winding of wires--were put into operation in the
VUM. In the assembly shop, the soldering, assembly, and adjusting of common
subassemblies has been mechanized on the bas been mechanized on the basis of
an assembly-line process. Automated design of machine components by means

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of computer systems is undergoing further development. This significantly accelerates the development cycle of new technology.

"The introduction of the first line of an automated management system (ASU) system for instrument production of the VUM plant is planned for this year. Electronic computer technology assists actively in the debugging and testing of finished products. This is how we achieve complete quality assurance. On condition that quality is nontheless assured by people."

"Evidently the people who developed the new machine fully accepted this responsibility?"

"The official commission that accepted the system took note of the high level of development of the model. Many departments of the Special Design Office and their leading specialists worked creatively--V. Mel'nichenko, V. Anopriyenko, R. Zaslavskiy, I. Inyakin, and others. It is simply not possible to name them all. Much and important work was done by the mathematicians, among whom one would like to mention Ye. Kovalya and V. Bakhtina. Our Moscow colleagues of the Institute of Electronic and Control Machines participated actively in the development.

"The Socialist competition in honor of the glorious October anniversary brought us success--based on the results of the first and second quarters of this year, the "Elektronmash" association was awarded first place and the floating Red Banner of the Branch."

The conversation about competition was continued at the Party Committee.

"The work collectives of the association," said the deputy secretary of the Party Committee A. F. Kobchenko, responded to the challenge of the workers of the Naro-Fominskiy rayon of the Moscow oblast: 'A Smashing Finish to the Anniversary Watch!' Active competition developed between shops, sections, and brigades related by the technological development cycle. Some 2,000 engineering-technical workers competed on the basis of personal creative plans. The work roll-call of our production workers continues with the enterprises--the Kiev association "Kristall," the Leningrad electromechanical association, the "Telemekhanika" association of Nal'chik, the Zhitomir association "Promavtomatika," and with the "Starkstrom-Anlagenbau" combine of Leipzig in the GDR.

"All this enabled us to over-fulfill the anniversary socialist pledges: to give the country seven above-plan computers instead of three.

"Demonstrating the communist attitude toward work, 86 workers of the association fulfilled the 2-year plan of the Five-Year Plan in 1-1/2 years. They are: the machinists G. S. Mokhnach and L. A. Sudakevich, the milling-machine operator V. I. Polishchuk, the adjustor A. P. Kravchenko, and others. Hundreds of production leaders are following their example.

"The work rhythm of the association is tight. The patriotic watch continues. Responding to the challenge of the leading enterprises of the city, the collective of the VUM decided to meet the 60th anniversary of Soviet power in the Ukraine with new successes."

USSR

THE DEVELOPMENT OF MINI-COMPUTERS

Moscow IZVESTIYA in Russian (Horizons of the 'Little' Computers." In One
Second--500,000 Operations.) 2 Dec 77 p 1

AFONIN, S.

[Text] During the past 10 years the output of computer technology in our
country has increased more than tenfold. Computer complexes have been cre-
ated for administration of technological aggregates and production, scientif-
ic research and experiments, keyboard computers for routine economic calcula-
tions, quality control of various industrial products, and invoice-account-
ing machines.

The leading position in control computer technology is presently occupied by
the class of machine called "little," or "mini-" computers. Moscow Institute
of Electronic Control Machines is the country's leading center for their pro-
duction. Testing has just been completed on a new mini-computer which is
unique in its own class and which has been manufactured domestically for the
first time.

"The 'explosion' of this family of electronic computers is caused by the ap-
pearance of a new component base which provides for adequately high technical
characteristics at comparatively low cost. On the other hand, the development
of mini-computers is called for by the insistent demands of current, more
effective control systems of varied categories," said Nikolay Leonidovich
Prokhorov, acting deputy director of the Moscow InEUM [Institute of Electronic
Control Machines, USSR Academy of Sciences] and Candidate in Technical Sci-
ences. Computers of this family developed by scientists at our institute
have been launched recently in series production in Moscow and Kiev enter-
prises. One of them is the SM-3, which is capable of completing more than
250,000 mathematical operations in one second. It has an extremely wide
range of prospective uses in the national economy. It is very effective in
the creation of computer control complexes for the automation of scientific
research, in planning and in other fields.

The SM-4, which has already been tested, is significantly more effective than
those manufactured earlier by our institute. This machine can complete more
than 500,000 operations simultaneously in one second. It is significantly
more compact and simpler to operate; its design and software allow the user
a wider range of functional capabilities.

On the basis of the facilities of the "little" computers it is proposed, in
particular, to significantly develop operational control systems in machine
construction.

With the aid of such computers, it will be possible to make forecasts during
metropolitan construction, to more effectively carry out the quest for mineral
resources, to make more rational use of natural resources, and to still more
deeply experience the secrets of the universe.

F. Programming and Software

EAST GERMANY

DEVELOPMENT OF SYSTEM DOCUMENTATION FOR THE ROBOTRON 4200 MINICOMPUTER
SYSTEM

POSPISCHIL, FRANK, Elektronikprojekt State Enterprise, Dresden

[Abstract] Some generally usable sub-programs which supplement the system
documentation provided by the manufacturer of the Robotron 4200 were de-
veloped. They supplement the SOEK 4200 control program system and the STAP
4200-S standard programs. The sub-programs described simulate the index
registers; simplify some organizational runs; and simplify chains of arith-
metic operations. Further development of the DIWA 4200-4 (a problem-oriented
dialog system) and of a memory-space-economical input-output system for eco-
nomical data processing are further projects. The Robotron 4200 minicomputer
has great potential for the intensification of the data-processing operations
in a cost-effective manner. The developments described pertain briefly to
the operation of an engineering bureau; however, the results can also be easi-
ly adapted to other fields. Overall, the developments contribute to the uni-
fication and simplification of programming in the Assembler program language.
Tables 5; reference 1 (German).

HUNGARY

STATUS OF PROGRAM CORRECTNESS VERIFICATION STUDIES

BARDOS, ATTILA, deputy department head, SZAMOK [Computer Technology Training
Center]

[Abstract] In this literature-review article, the author first describes
briefly the general inductive method of Floyd, and then discusses and evalu-
ates the results achieved in the field of realizing the automatic and inter-
active verification translation methods. Using a promising system described
in the literature as an example, it illustrates the efficiency of the methods
and software used and outlines the prospects of the program correctness veri-
fication systems. For the discussion, the article defines the program cor-
rectness and the verifiability of programs, and explains in some detail the
verification of programs written in ALGOL and similar languages. The auto-
matability of program verification is touched upon, and it is concluded that
the flexibility and combinability of the verification systems should be im-
proved. Sometimes the length and complexity of the verification are greater
than those of the program to be verified. Figures 6; references 48: 4
Yugoslav, 1 German, 43 Western.

HUNGARY

STRUCTURE AND PROGRAMMING

ESZTERGAR, ZSOLT, department head, SZAMKI [expansion unknown]

[Abstract] This editorial discusses "structured programming," a term intro-
duced by E. W. Dijkstra. This approach was originally touted as leading out
from the software crisis. But the term convers many concepts, some of which
conflict with each other. This may create misunderstandings and confusion.
The unsuspecting person, who desires to find out what structured programming
is all about, could easily conclude that it is no more than a fad, which per-
mits some computer-technological exhibitionists to mouth some trivialities.
With some malice, we may even say that structured programming is a slogan and
nothing more, in the sign of which some adventurers may create spectacular
victories without real substance. A review of the literature of structured
programming demonstrates the heterogeneity of terms and concepts included in
this catch-all name. This may well lead to a devaluation of the term and may
well not lead out from the software crisis. The purpose of the editorial was
to generate thoughts in the mind of the readers and to caution them in their
evaluation of this subject. (The articles in this issue deal with various
aspects of structured programming.)

HUNGARY

EXPERIENCES GAINED IN DEVELOPING A PROGRAMMING METHOD AND EQUIPMENT

FERENCS, LASZLO, assistant staff scientist, and HORVATH, ADAM, assistant
staff scientist, SZAMKI [expansion unknown]

[Abstract] The task was to design and program a logic input-output system
for the R-10 computer as part of an application system. The development had
to be inserted as a subsystem in similar systems and easily modified as need-
ed. The task was solved by means of structured programming. The authors
separated the task into levels by means of the top-down method, in such a
manner that each level represented a functional unit. The algorithms of cer-
tain activities belonging to the function were defined at each level, uti-
lizing the algorithms of the levels below. Each level is independent to the
extent that it contains a number of various solution possibilities for a
given part problem. The levels were separated into modules where this was
necessary in order to separate the data areas. The uppermost level provides
a solution of the task using these possibilities. Maintenance is performed
by stepping back to the level of which the resources are inadequate, expand-
ing them as needed, and carrying the expansion forward to the uppermost level.
The designing and implementation of the program involved the following steps:

(1) defining the structure of the external object; (2) writing the transitions of the automaton; and (3) stating the activities to be performed in the individual states where the status organizer of the automaton, the lower layers, may be used. Figures 2.

USSR   UDC   621.391.15

CERTAIN BOUNDARIES FOR CODES WHICH CORRECT ERRORS AND DEFECTS

TSYBAKOV, B. S.

[Abstract] A study is made of a memory device with defective memory loca-
tions and random errors. Data can be stored in such a device using codes
which correct for defects and errors. The upper and lower limits of the
probability of erroneous retrieval, corresponding to the use of the optimal
code, are constructed. The calculation is based on modeling of the memory
device as a channel for information transmission in which the information is
propagated through time rather than through space. The only type of defect
considered for the hardware is one which causes the memory device always to
output the character 1 (or the character 0) regardless of which character has
been stored in the location in question. Figures 5; references 4 (Russian).

USSR   UDC   658.012.011.56:681.3.06.001

SOFTWARE AND EFFECTIVENESS OF AUTOMATED MANAGEMENT SYSTEMS

KUZNETSOV, V. S., assistant chief, Computer Department of "Soyuzsistemprom,"
KEZLING, G. B., general director, Scientific-Industrial Department of
"Lenenektromesh" [probably "Leningrad Electrical Machines"], Candidate in
Technical Sciences

[Abstract] Software has become the major item in automated management systems
[ASU] already representing 60-70 percent of the total cost and tending to ab-
sorb an even larger share. Its basic function is to ensure, through the means
of computer programs, the realizability of any given management method. The
most effective modern tools of programming are card decks collected in data
banks, which contain final algorithmic solutions ready for computer process-
ing and which include a mechanism for automatic adjustment to the problems of
a specific user. Such decks serve either of two purposes: to organize the
data (including information retrieval) for a given ASU or to process these
data (including economico-mathematical evaluation). Among such applications,
program decks completed by the "Soyuzsistemprom" are those for data integra-
tion and processing systems with a special input-output generating unit, gen-
eral purpose ones such as "Sinbad," and numerous special-purpose ones. A
separate group of decks is used for numerical solution of problems by grid
methods. Of particular interest to industrial users is a set of decks pro-
viding information for production management (five decks: supply management,
demand management, capability planning, plant management, and data integra-
tion and processing). Many problems can be solved with the aid of already
available program decks, but an expansion of the data bank is also foreseen
within the framework of the current Five-Year Plan.

G.   Automated Design and Engineering

AUTOMATED DESIGN OF AUTOMATED MANAGEMENT SYSTEMS

ROZINKIN, A. YE., chief engineer, Computer Department of "Soyuzsistemprom,"
Candidate in Technical Sciences, and KHOTYASHOV, E. N., assistant director for
Scientific Research, All-Union Scientific Research and Planning Institute,
Department of Automated Management Systems, dr of economic sciences

[Abstract] There are four basic methods of designing standard automatic
management systems [ASU] in the component-type method the entire system is
divided into a finite set of components functionally independent on the prob-
lem level, with the problem not depending much on the type of information,
and with complete functionality for multiple applications. Standard design
solutions contribute to time and labor savings, but this method has some
disadvantages which include a lack of a program integration system and an in-
sufficient capability for adjusting to specific requirements in a given ASU.
The subsystem method features a higher degree of integration of standard com-
ponents for ASU. The object method yields ASU for a generalized or standard
object within some class, but this class is usually narrow and the means for
adjusting to specific conditions in a control object are insufficient. The
model method features systemness, availability of a total informational model,
adjustability of the management criteria, totalness of the means of adjust-
ment, and availability of an apparatus for improving and developing the ini-
tial informational model as well as the ASU to be designed. A qualitative
evaluation regarding the applicability of each method can be based on a
multitude of parameters characterizing the standard management system and
the management process as well as the ASU thus designed. The design of ASU
can, furthermore, be automated. For this purpose, the appropriate method
must be selected and this process is illustrated in the paper, with minimiza-
tion of the design labor as the target function. Finally, the criteria could
be established for automizability of the design of an ASU. The design pro-
cess is facilitated by a given model of the object in terms of man-computer
design operations. References 3 (Russian).

USSR

COMPUTERS IN THE SERVICE OF MANAGEMENT

Riga SOVETSKAYA LATVIYA in Russian 27 Oct 77 p 3

NIKITINA, I.

[Text] This is a whole city "populated" by machines and equipment. Its main
inhabitants are high speed electronic computers. Here, in the laboratories
of the Institute of Control Problems (IPU) USSR Academy of Sciences, basic
questions related to the most diverse areas of science and technology, pro-
duction and planning are being worked out.

The well-known program "Kaissa," which was the winner of the first world cham-
pionship among computerized chess systems, was developed in this institute.
Academician Vadim Trapeznikov, director of the Institute of Control Problems,
had the following comments to make about this remarkable match:

"For decision-making theories, which are assuming ever greater importance in
modern industry, a chess game is an excellent model. Methods developed by
Soviet scientists for game programs are widely used in practical management,
particularly in cases where it is impossible to foresee precise results and
where rapid readjustment for variations is necessary."

However, the Institute can only discover solutions for these and other prob-
lems on the basis of their own inherent value and significance as demonstrated
in practice. An automated management system (ASU) created at IPU for the
technology of continuous-operation concrete plants was "put to work" on the
construction of the largest hydroelectric power stations in the country, just
after the end of World War II. Since that time, work on the refinement of
ASU's has assumed a top-level importance. The "ASU-Metal" for coordination
of the supply of metals to the entire country and "ASU-Morflot" for control
of the merchant fleet have been developed. Aeroflot has received "ASU-Sirena"
for large-scale processing of airliner passenger tickets. "ASU-Listoprokat"
went into operation at large metallurgical enterprises. "ASU-Bol'nitsa" was
developed for multidisciplinary medical clinics...

The Institute's best projects have been given USSR National awards. Among
these projects was an automatic system for management of the processes of hot-
rolling tubes which are used in the manufacturing of ball-bearing races.

The demands for precision in races are increasing all the time, but complying
with them is not so easy. Heated to thousands of degrees, the bar of metal
from which the tube is made is rushed through the rolling mill at a speed of
several meters per second. Then, a self-aligning automatic system measures
the incandescant bar and also, at that point in the operation, performs the
necessary readjustment of the mill to ensure precise and uniform dimensions
in the intermediate product.

This mill at the Pervoural'sky Novotryub Plant is the most productive in world metallurgy. At the mill the smallest possible expenditure of metal per ton of finished tubing is achieved. At present, preparation is underway for equipping all pipe-rolling mills in the country with such systems.

One of the recent large projects of the Institute is an economic information system (INES). I had occasion to be present when it was first shown to an industrial representative. To a man of the last century, these moments of contact between humans and machines would have seemed mystical indeed. He would have interpreted all that happened as being like a spiritualist seance...

Doctor in Physicomathematical Sciences Yuriy Ivanov, one of the creators of the system, asked the INES a question--it understands human language!--and in answer, words and numbers flowed onto the screen. Speaking of the potentials of INES, Yuriy Ivanov pointed out that it not only gathers and stores information but also the direction of its processing. The INES is capable, for example, of establishing plans for entire sectors of industry, of developing interindustrial balances, of conducting direct planning computations and of controlling the fulfillment of production assignments.

"It seems to us that at this time the potentials of INES are particularly valuable for the solution of concrete problems of the 10th Five-Year Plan," says Semen Berkovich, candidate in physicomathematical sciences, who is one of the new system's originators. "In fact, under conditions of accelerated industrial growth, its specialized skills are becoming all the more necessary for high-quality calculations of the operational effectiveness of industrial complexes and associations and in the search for optimum economic solutions.

In many of the laboratories at the Institute, there are blackboards on the walls, as in schoolrooms: on them are formulas, numbers and diagrams around which there are sometimes heated disputes, and at other times attentive silences. Here, in the concentration and in the discussions, are born the electronic complexes of the next generation, which will replace manual labor in those parts of industry where it still remains and which, more and more often, will be able to assume the intellectual labor for people in many spheres of their activities.

POLAND

INTERNATIONAL LEIPZIG FAIR--SPRING 1977

DE MEZER, JERZY, Mgr. inz.

[Abstract] The Spring Leipzig Fair was held this year from 13 through 20 March 1977 under the traditional motto "Free World Market and Technical Progress." Nine thousand exhibitors from 60 countries participated in the fair. The present fair reflected an increasing role of international cooperation, which resulted in the first place from socialist economic integration of the CEMA countries. Great importance was likewise attached to economic and technical contacts with numerous firms of capitalist countries. Numerous trade and economic agreements concluded with developing countries by the foreign-trade companies of the GDR were also very beneficial. Of greatest interest to Poland was the economic cooperation between Polish and GDR industries. This was reflected in numerous exhibits ranging from textile machines to shipyard equipment, agricultural machinery and electronic ESER computers for data processing and automatic control, produced by several Polish industrial enterprises in cooperation with ROBOTRON (GDR) enterprise and other CEMA producers. Poland, for example, supplies GDR with certain types of peripheral equipment such as mosaic and line printers, punchers and tape readers and magnetic stores. Poland's contribution to the Leipzig fair was the largest, after the USSR's foreign show. The success of Polish technology was reflected by the award of four gold medals, among other things for the production line of ceramic capacitors and the microwave hygrometer. The East German technical achievements were represented by a demonstration of the practical application of the small computer sets, PRS 4000 and KRS 4200, for automation of various technological processes. The central units in the computer sets of 4000 and 4200 families were correspondingly represented by ROBOTRON 4000 and ROBOTRON 4200, both of the third generation. Their high efficiency, large assortment of peripheral equipment and versatile software makes it possible to put them to various uses. Moreover, their typical interface permits the formation of systems with parallel or hierarchic cooperation of several ROBOTRON 4000s and 4200s between themselves or with other computers of the ESER (RIAD) uniform electronic computing system. The chief technical parameters of ROBOTRON 4000 computer are given and six photographs with the following captions are provided: 1) ROBOTRON 4000 central unit and electrical typewriter SM 4000; 2) Punch tape reader CT 1001; 3) Polish EC 7033 line printer; 4) EC 5052 disk store; 5) IBT 4000 type programming-control stand; and 6) 02 013 level recorder.

USSR

AN AUTOMATED MANAGEMENT SYSTEM FOR RESIDENTIAL AND COMMUNAL SERVICES IN
SVERDLOVSK

Moscow EKONOMICHESKAYA GAZETA in Russian ("On the way to 'ASU-Oblast'") No
25, Jun 77 p 17

MORSHCHAKOV, F., first deputy chairman of Sverdlovsk Oblast Executive Commit-
tee and STEPANOV, S., chairman of Leninsk Rayon Executive Committee, Sverdlovsk

[Abstract] The volume of services performed for the population in Sverdlovsk
has almost doubled during the past decade. An automated management system
[ASU] created by the Sverdlovsk Planning and Design Bureau of the Instrument
Building Ministry, the Academy of Communal Economy imeni Pamfilov, the Main
Computer Center of the Ministry of Residential and Communal Services [Minzhil-
komkhoz] of the RSFSR and the Oblast Communal Services Administration is now
facilitating management of this growing group of services. The system per-
forms 125 jobs including the calculation of capacities of enterprises, deter-
mination of production programs for enterprises, generation of labor and wage
plans, cost accounting, etc. The computer regulates the activity of public
transportation, water supply, bath and laundry and hotel enterprises, street
cleaning and other public services. Among the other benefits of the introduc-
tion of the system, called "ASU-Oblast," has been the required improvement in
the organizational structure of the services covered by the system. The ini-
tial stage of the automated management system will cost some 9,000,000 rubles,
but will save 5,000,000 rubles per year and play an important role in increas-
ing the effectiveness of provision of public services in the Oblast.

USSR

COMPUTERS IN THE QUALITY CONTROL SYSTEM

Minsk PROMYSHLENNOST' BELORUSSII in Russian ("Round Table" "Industry of Belo-
russia" "Man-Electronic Computer--Quality") No 9, 1977 pp 53-60

Unsigned

[Abstract] A "round table" discussion of the editors of the journal on the
subject of computers in the quality control system. The discussion involved
the Deputy Chief of the Department of Automation of Quality Control of TSNIITU
[Central Scientific Research Institute for Control Technology], L. Malashenko;
Laboratory Chiefs of this same institute E. Mamchin, N. Kachan, Ye. Mordvilko
and Candidate in Technical Sciences V. Soldatov; the Chief of the Laboratory
of the Institute of Engineering Cybernetics, Candidate of Technical Sciences
A. Grivachevskiy; the Chief of the Laboratory of Quality Control of the Minsk
Tractor Plant' A. Kashtanov; the Chief of the Department of Quality Control
of "Gorizont" V. Kalyuta; the Chief of the Automated Enterprise Management

System of the Minsk Machine Tool Plant Ye. Solop; and the Chief of the OTK [Department of Technical Control] of this same plant A. Shibayev. Beginning with the study of the quality control system as it exists, the participants then turned to a discussion of future developments in computer-assisted quality assurance. The Institute of Engineering Cybernetics of the Academy of Sciences, BSSR, has developed a computer-based automated planning system called SAPR. The first enterprises where it is to be introduced have also been determined. They are "Gorinzont," the Special Design Bureau for Automatic Production Lines and the Minsk Motor Vehicle Plant. It is concluded that quality control must be begun by automation of planning, after which technical preparation for production must be included. However, it is the computer's role as a process controller which allows it to influence most directly the quality of products produced. The problems involved in the use of electronic equipment in quality assurance systems are great. The participants in the "round table" discussion agreed, however, that extensive use of computers throughout the production and quality assurance process could improve quality control of industrial production.

USSR

MATERIAL-TECHNICAL SUPPLY ASU IN UKRAINIAN SSR

PRAVDENKO, S.

[Excerpt] Ten years ago a computer center was created in order to improve supplies in our republic. This center then grew into the Industrial-Technical Association "Ukrglavsnabsistem" (probably Ukrainian Main Supply System) of Glavsnab UkrSSR (Main Supply Administration Ukrainian SSR).

V. G. Karnaukh, the director general of this association, described how they are carrying out the basic complex of tasks involved in the creation of the republic's ASUMTS (automated management system for material and technical supply): they study existing systems of supply and marketing; build models of and establish the basic functions and goals of material-technical supply agencies; develop computer programs; design the technology for computerized data processing; carry out experimental checking of solutions; and conduct practical calculations.

The association is creating the republic's ASUMTS with the participation of various institutes and under the scientific and methodological direction of the Institute of Cybernetics, Academy of Sciences, Ukrainian SSR. The first stage of the system has already been introduced--the ASU "Metal," the ASU "Coal," the ASU "Cement" and others. They will become an integral part of republic and state-wide automated systems.

Take, for example, the ASU "Coal." Every day information about the progress
of the deliveries from the unloading stations enters pivotal dispatcher points
of the rayon coal marketing departments. The data are processed on the com-
puter. The results received are used by the Administrations "Donetskuglesbyt"
[Donetsk Coal Marketing], the "Voroshilovgraduglesbyt" [Voroshilovgrad Coal
Marketing], the "Ukrglavugol'" [probably Main Coal Administration), "Soyuz-
glavugol'" [Main Administration for Interrepublic Deliveries of Coal] for
analysis and monitoring of fuel supplies and accounting with suppliers. More
than 250 ministries, departments and organizations of the country already use
the developments of the industrial-technical association of "Ukrglavsnabsistem."

The association's computer centers resolve more than 500 problems concerning
material and technical supply, every year completing over 16,000 calculations.
The automated resolution of these problems saves the national economy more
than 5 million rubles per year.

25

G. Extractive Industries, Fishing

USSR

USE OF A NEW AUTOMATED MANAGEMENT SYSTEM IN THE PETROLEUM INDUSTRY

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ("An Industry-Wide ASU is in Operation") 30 Sep 77 p 2

MAMED'YAROVA, M., Baku

[Text] The first phase of the automated management system of petroleum re-
fining and petrochemical enterprises--ASU "Azneftekhimprom" [Azerbaydzhan
Petroleum Chemical Industry] has been incorporated into industrial opera-
tions by the state commission in advance of the projected date of completion.
Success has been achieved because of the combined efforts of the developers
of the system: the Azerbaydzhan Chemical and Petroleum Institute imeni M.
Azizbekova, the Scientific Research Planning and Institute "Neftekhimavtomat"
[Scientific-Research and Planning Institute for Complex Automation of Produc-
tion Processes in the Petroleum and Chemical Industries] and the multiple-
user computer center of the republic's Ministry of Petroleum Refining and the
Petrochemical Industry.

The system's first phase solves 18 problems, including operational management
of production, experimental plans for a complex of petroleum refineries, moni-
toring of document execution, direction of capital construction, and others.
At the present stage of its development the system serves the Ministry's staff
and the Plants imeni A. Karayev and "Neftegaz" [oil and gas]. The introduc-
tion of the first phase of the ASU saves the economy about half a million
rubles per year. Towards the end of the five-year plan an automated manage-
ment system for the petroleum refining and petrochemical industry will be in-
troduced in its full capacity, including ten subsystems and 34 problems and
encompassing all industrial enterprises in the Ministry.

USSR

AUTOMATED MANAGEMENT SYSTEM FOR BAKU OIL REFINERY

Baku BAKINSKIY RABOCHIY in Russian ("Target Selection") 5 Nov 77 p 3

MAMEDOV, SH.

[Abstract] The first stage of a now automated management system is in opera-
tion at the new ELOU-AVT [expansion unknown] installation at the Novo-Bakin-
skiy Petroleum Refining Plant imeni Vladimir Il'ich, where it controls complex
technological processes. Only one year was required for the development of
the system, including new types of monitoring and communication devices as
well as programming. Three institutes are credited with the development and
implementation of the system--the Faculty of Information-Measurement and
Computer Technology of the Azerbaydzhan Institute of Petroleum and Chemistry

imeni M. Azizbekov, headed by Dr in Technical Sciences T. Aliyev, a laureate of the USSR State Prize, the Moscow Scientific Research Institute of Control Problems, and the Design institute "Azgiproneftekhim" [possibly Azerbaydzhan State Institute of Petroleum Technology].

The second stage of "ASU ELOU-AVT," planned for completion by 1979, will feature optimal control of individual aggregates and complexes, and two-way communication between monitoring devices and computers in the refinery's information center. The computers will not only collect and process information but will intervene in production processes to eliminate problems.

USSR

CYBERNETICS AGAINST CORROSION

[Text] Riga. The Institute of Electronics and Computer Technology of the Academy of Sciences, Latvian SSR has created a complex of equipment for investigating corrosion processes that last hundredths, thousandths, or even millionths of a second. Dynamic control of the experiment without human intervention is conducted by a logic device based on integrated circuits.

The information obtained has great practical importance over and above its theoretical significance. It is needed for the development of improved means of protecting metals of prefabricated structures against corrosion and also for predicting their resistance to rust.

The new equipment has successfully undergone testing and has been made ready for serial production.

USSR

AUTOMATIC MANAGEMENT SYSTEM FOR STEEL MAKING IN CONVERTERS

KARZOVA, V.

[Abstract] An ASU [automated management system] for the smelting of steel in converters, suggested by young scientists, has achieved a savings of 500,000 rubles per year by increasing the number of melts without requiring adjustment of the composition during the steel-making process. This article briefly discusses the work of Aleksandr Koshelev, Sasha Kropochev, and Sergev Karepov in the introduction of computers for control of the steel-making process at the plant. Also concerned were collaborators of the All-Union Central Scientific-Research Institute of Complex Automation, among whom was Misha Petrunin, an engineer-steel smelter.

USSR

NEW DEVELOPMENTS IN COMPUTER TECHNOLOGY

Minsk SOVETSKAYA BELORUSSIYA in Russian ("A Good Helper--The Electronic Computer") 22 Nov 77 p 3

[Text] The development of new technological processes has been taken over by electronic computer technology at the Minsk Automatic Assembly Line Plant. The technologist need only encode the blueprint of the parts and read it into the computer. The machine will estimate the stock of machine tools, the availability of the equipment and materials and will make the necessary recommendations. The new product, from preparation to output, may be completed in from one-quarter to one-fifth of the time ordinarily required.

Belorussian scholars will report on the operation of this new automated system developed at the Institute of Technical Cybernetics, Academy of Sciences, Belorussian SSR, to participants in the All-Union Conference on Control Problems which began on November 21, 1977 in Minsk. More than 700 scientists will discuss issues concerning the management of the economy and technological processes, and problems concerned with the interaction of man and machine in automated systems. The results of research in design automation and automation of scientific experiments and theories of automated control systems for moving objects, such as spacecraft, airplanes and ships, will also be correlated.

"In the management field, science is now solving the highly complex problem of converting to new forms of utilization of computer technology," said G. S. Pospelov, corresponding member of the USSR Academy of Sciences, in a conversation with a BELTA (Belorussian News Agency) reporter. "The computer should work in the so-called dialogue mode, where it is possible to express the program in ordinary human language rather than to program it, of even to give oral instructions. Many difficulties have already been resolved, and at the conference reports concerning research in this field are eagerly awaited. Having learned to converse with the machine without benefit of a translator-programmer, we not only approve this new use of computer technology, but the creation of artificial intelligence will be imminent."

The conference will continue for five days.

USSR

ELECTRONIC COMPUTER FUNCTIONING AS A QUALITY CONTROLLER

GAVRICHKIN, V., special IZVESTIYA correspondent, Omsk

[Abstract] A description is given of the "Elektrotochpribor-1" ASUTP [auto-mated management system for technological processes] developed by the Omsk Planning and Design Bureau for ASU's [automated management systems] and manufactured by the Elektrotochpribor [Precision Electrical Instruments] Plant. The system consists of a control computer complex supplemented with five nonstandard units. The computer's memory stores tests necessary for checking the quality of printed circuit boards, assembly of modules, and proper operation of the product in all measurement modes and ranges and for determining malfunctions in each instrument made by the plant. By pressing a button it is possible, for example, to ask the computer to check the wiring of an assembled module of a general-purpose measuring and information system which consists of about 300 connections, and 7 seconds later a teleprinter will print out the exact location of any wiring error or imperfection. Pre-viously it took more than 2 hours to test out the same module by hand, with no guarantee that all bugs had been eliminated, and finished products not in-frequently failed to operate. Three thousand tests can be made in a matter of minutes on a measuring and information system for determining strength characteristics. If a malfunction is discovered in an individual module the computer tests out this model separately. Assembly of printed circuit boards can be checked practically instantaneously, whereas this took at least 1.5 hours when performed manually with an oscilloscope. The quality of manu-facture of the board as a whole is checked first; then points of malfunction-ing are listed in sequence, indicating which is to be eliminated first before going on to eliminate the next. Previously 30 to 50 percent of labor costs represented quality control expenses. The new automated system has made it possible to increase labor productivity for testing operations three- to fourfold and to save the plant about 400,000 rubles per annum. The new sys-tem also makes it possible to keep a record of the design development of an instrument by storing test data on tape. The second phase of the system, to be put into operation in the near future, will make it possible to control systematization of operations accounting and to develop optimum processing routines. Six instrument making plants in the country have already ordered automated system designs for themselves. It took almost 2 years for the Elektrotochpribor Plant to implement its project. A lack of sufficient stan-dardized technical documentation and long delays in delivery of hardware hampered more rapid realization of the system. The rate of manufacture of nonstandard equipment compatible with control computer complexes must be in-creased as soon as possible.

I. Power System

EAST GERMANY

MICROCOMPUTERS IN USE WITHIN THE ELECTRIC POWER INDUSTRY

GASSE, HANS-JOACHIM, dr, Computer Center, Power Institute, Leipzig

[Abstract] No microcomputer-controlled system in the power industry will perform exactly as planned and forecast. We do not know all the limiting conditions during the planning stage; we can never foretell all the eventualities that may occur; and the tasks often change. To some degree the system may be adapted to changed or new conditions by program changing. As an example, the article describes the use of a microcomputer-controlled system at the Vetschau Power Plant to illustrate the use of such a system in a power facility. The task was to indicate the working point of a 100 MW generator and to monitor it. The point was identified by digital display of the horizontal and vertical distances from the limit curve. This was accomplished by a stable and reliable system based on an I 8080 microprocessor, developed at the Central Institute for Computer Science. The system has operated satisfactorily since 1975. Another installation described briefly involves the use of microcomputer control of a DIGIGRAF 1008 R drawing machine. A brief outlook of the future potentials of microcomputers in the power industry indicates that there are many possible and useful applications. Figures 5; references 10: 1 Western, 9 German.

USSR

INTRODUCTION OF THE M6000 COMPUTER AT THE BURSHTYNSKAYA REGIONAL ELECTRIC
POWER PLANT

ANDRIYEVSKIY, S., engineer, Burshtyn, Ivano-Frankovskaya Oblast'

[Abstract] The GRES [State Regional Electric Power Plant] at Burshtyn must
supply electric power to part of the Soviet Ukraine and cities and villages
of Bulgaria, Hungary and Rumania. This 2.4 million kilowatt power plant has
a very complex load schedule because it supplies such varied types of loads.
Recently, the Kiev Institute of Automation imeni the 25th CPSU Congress com-
pleted installation of the latest M6000 computer at the power plant. The
new computer now controls all of the power units at the plant. Dr in Techni-
cal Sciences Anatoliy Zinov'yevich Grishenko, assistant director of the insti-
tute, presents a popular description of the tasks performed by the ASU [auto-
mated management system], including control of power units, load distribution
among power units, automatic startup and shutdown of power units, accounting
and reporting of the operation of the power generation and distribution sys-
tem. The annual economic effect resulting from the introduction of the new
automation system is 750,000 rubles.

USSR   UDC 681.14-523.8

USE OF THE "NAIRI-K" COMPUTER FOR THE COMPOSITION OF A LIST OF THE MAKEUP OF
A TRAIN

KARYAKIN, B. A., Senior engineer, Gor'kiy Railroad Computer Center

[Abstract] A "Nairi-K" computer has been in use for some time for the com-
position of lists of cars included in trains made up at the Gor'kiy sorting
yard. A special program written to adapt the MTK-2 teleprinter code used by
the railroad to the code used by the computer is described. Flow charts are
presented for the information input and output programs coupling the computer
to the teleprinter system. A functional diagram of the software system used
for automatic output of information from the computer to punch tape is pre-
sented. Figures 4; tables 4.

USSR   UDC 658.012.011.56:656.2"71"

PROSPECTS FOR THE DEVELOPMENT OF AUTOMATED MANAGEMENT SYSTEMS FOR RAILROAD
TRANSPORT

PETROV, A. P., corresponding member, USSR Academy of Sciences, and ANDRIANOV,
V. P., candidate in technical sciences

[Abstract] A description is presented of the planned combined automated man-
agement system for railroad transport [ASUZhT], which is to mesh with the
ASU for other types of transportation as a coordinated complex, a single
statewide system. The overall task of the system is to achieve optimum con-
trol of the transportation process in its broadest sense. Railroad trans-
portation can be analyzed from the standpoint of systems engineering as a
large and complex system; the authors address the question as to whether a
computer is necessary to control such a system. They side neither with "hu-
man control" nor with "machine control" advocates and reject the notion that
a detailed written plan, generated by a computer, is necessary for everyday
operation of each small subdivision of the railroad, although maintaining
that operation of the railroad as a whole can be most efficiently controlled
by an ASU. A block diagram is presented of the proposed management system,
with the inputs at enterprises at each station combined before being trans-
mitted to the railroad line control computer and communication complex, where
further data compression occurs as messages move up and down the hierarchical
scale within the nation's entire railroad system. Figure 1.

USSR

COMPUTERS IN TRUCK TRANSPORTATION

Moscow IZVESTIYA in Russian ("Electronic Computer--Assistant for Driver")
22 Oct 77 p 5

OBYDENNOV, A., Chief, Tatar Transport Administration, Kazan', Candidate in
Technical Sciences

[Abstract] Introduction of a new computerized ASU [automated management sys-
tem] called "ASU-autotransportation" at the Tatar Transport Administration in
Kazan' has reduced the number of trucks required to service the region from
600 to 150, in spite of the fact that the volume of cargo transported has
tripled. The principal reason for the increase in effectiveness is that ef-
ficiency is now measured on the basis of results, cargo moved from source to
destination, rather than the number of ton-kilometers run up during the course
of a year. The ASU has been a tremendous help, but could be of still more
assistance if the computer industry manufactured computers which take into
account the specific features of motor vehicle transport. The author notes
that the introduction of an automated management system requires that every
aspect of the transportation process, including repair and maintenance of
vehicles, be converted to new methods and systems, with traditional methods
abandoned. This represents a problem of logistics. When these problems of
lack of suitable computer equipment, entrenchment of conditional practice and
construction of buildings such as garages which are designed to be used by the
old method can be overcome, computerized automated management of transporta-
tion unions can be an even greater help to the economy.

USSR

COMPUTERIZED FREIGHT FLOW CONTROL

Kishinev SOVETSKAYA MOLDAVIYA in Russian ("Electronic Computer Guides Freight
Flow") 13 Nov 77 p 2

GOLYAYEV, A., TASS Correspondent, Moscow

[Abstract] The trip sheets sent out with trucks delivering goods from Mos-
cow's Motor Vehicle Combine No 1 indicate not only where goods are to be
picked up and delivered, but also the time for pickup and delivery, and the
most efficient route to follow on the way. These and other data are prepared
by a computer, part of the ASU [automated management system] of the combine.
The combine services 40 plants, 3 housing construction combines, many con-
struction projects and in general performs transportation tasks throughout
the city. Computerization of scheduling and routing has achieved a savings
of 600,000 liters of fuel and increased cargo handling capacity by 6.5 percent
in comparison with last year.

L. Construction

USSR

USE OF COMPUTERS IN CONSTRUCTION INDUSTRY

Moscow STROITEL'NAYA GAZETTA in Russian ("A letter From a Computer") 18 Nov
77 p 3

SOBOLYEV, I., Cherkassy-Moscow

[Text] Automated management systems (ASU) are being introduced on a wide
scale throughout the country in all areas of the national economy. More and
more often, as the basic units of an ASU, the computers used are the more
modern third generation electronic computers. Our account will relate the
experience of their use in the construction industry.

A wide range of very diverse feelings must, one is convinced, come over any
uninitiated person when he first steps over the threshold of a computer
center. The novice feels a certain timidity as well as an admiration that
approaches envy for the programmers, who type on the computer keys with musi-
cal abandon, and has a sense of proud participation with the people who are
the creators of the electronic machines. But whatever the feelings, computer
language is strict, without sentiment, and has logic and precision of state-
ment.

Even the speech and appearances of Igor' Vasilyevich Tishchenko, director of
the Cherkaspromstroi Combine computer center, are noted for this character-
istic. He is proper, but without dryness, steady, but not apathetic; his re-
marks are detailed yet without unnecessary length.

"Our center is youthful both in terms of the average age of the staff members
and its development," the director tells us. "The official timetable was au-
thorized last fall, but by September of this year we will be serving all of
the construction companies of the city. Before this, there was an intensive
preparation period for assembling the computers, working out algorithms and
checking out programs."

Igor' Vasilyevich invites me into the machine room. His environment is mod-
ern and altogether typical of a computer center: upholstered, "lunar," punc-
tuated by neon lights; there are the bluish-white plates of the equipment--
the computer, the storage file, the input and output devices. In this com-
puter center, the third generation "YeS-1020" computer has been installed.
These machines have a number of advantages in comparison with the most up-to-
date machines of not long ago: a higher speed of operation, larger memory
capacity and the ability to connect to many peripheral units.

In the machine room, the operators are conducting a "test run" on a computer
of the "SORAS" subsystem which sets up the optimal schedule for transporting
concrete to a project. Engineer-programmer Tat'yana Kirichkova places a
stack of punch cards into the computer with efficient, well-practiced motions.
The number of cards corresponds to the number of sites under construction in
the city, and each of them contains specially coded information: the number
of target construction sites, the combine erecting each and the type and
quantity of concrete required on this day.

The operator pushes the "START" key. Data are fed into the computer; red numbers flash rapidly onto the display board of the memory units. Initial information received, the machine searches its memory for the required program. After retrieval, the printer "Konsul" taps out "BEGIN" with the rapidity of a machine gun.

One of the most unique and, if feelings are to be counted, romantic features of the new machine is its ability to carry on a dialogue with her. Vera Ivanovna Kharchenko, head of the in-line information processing department, sits at "Konsul." She prints "Yes." Permission has been given, and the machine begins to process the input data.

Several details about the operation of the computer are interesting. The instruction from the machine: "Indicate the job." The operator prints the job number. Question from the machine: "Is an input of the request to be repeated?" The printed answer: "No." An instruction from the computer: "Indicate the number of copies of the schedule." The answer from the operator: "Three."

Finally, the machine prints out the schedule. Now, there will be a precise graph indicating the delivery of concrete to construction sites in the hands of the foreman, of each driver, of the garage director and of the combine managers. The entire programmed cycle takes place in 11 minutes. The results, however, equal the daily production of the special group from all the city's combines who composed the schedule by hand until recently.

But the object of Tishchenko's special pride is the subsystem "Analiz," a complicated algorithm which was developed by the department for defining the goals of the center. This unique program has no peer in any computer center in the country. Its substance: the computer performs an analysis of the construction done by each combine—the lack of machinery, machine breakdowns and other factors, accumulates them in the memory and, each 10-day period, prints out a letter to the combine manager:

"Esteemed Comrade..! Your organization, in the period from the 1st to the 10th of September operated "well" ("exceptionally well," "very poorly" and so on).

The letter is placed on the director's desk. With such an unimpassioned judgment from an electronic arbitrator, none of the managers can complain of bias against them.

The computer's capabilities are indeed without limit; no one can describe the exact outlook for them. Only the top layer in our knowledge of them has been "loosened." And more than once, one is amazed by the fantastic nature of the solutions arrived at through the combination of these possibilities and the research of scientific thought.

The introduction of automated systems is a process both irreversible and systematic. By 1976, 510 ASU's were in operation at managerial levels in the construction industry—from the union ministries to the combines—of which 64 belonged to the third generation. By 1980, there are plans to put 564 ASU's into the construction industry.

USSR

COMPUTER EQUIPMENT IN CZECH TRADE

Moscow SOVETSKAYA TORGOVLYA in Russian No 7, 1977 pp 38-42

BELOBRADEK, I., Chief, Division of Economic Information, Ministry of Trade, Czechoslovak Republic

[Abstract] This article reports on the use of computer equipment in domestic trade in Czechoslovakia. During the 5th Five Year Plan (1971-1975), the use of computers in domestic trade was greatly expanded. Features included: accelerated development of automated data processing; development of the activity of the computational and organizational service (PORS); creation of a central computer center for trade acting as a data bank; development of a state plan for science and technology in the area of creation of an information system for control and optimization of supply of the trade network. The introduction of electronic data processing to various spheres of trade activity is considered, including accounting for the movement of goods in wholesale trade, accounting for goods in retail trade, bookkeeping, accounting for funds and inventory; and accounting for labor and wages. The advantages and disadvantages of the switch to electronic data processing are discussed, as are the upcoming tasks for the state plan for development of science and technology, the development of the PORS central computer center and the creation of the necessary base of materials and equipment for computerization of trade information processing. During the 9th Five Year Plan, PORS put 62 computers on line in the CSSR instead of the planned 33. This fact is characteristic of the extent to which the 5th Five Year Plan was overfulfilled in this area.

USSR

BOOKKEEPING OPERATIONS AUTOMATED IN TRADE ORGANIZATION

Moscow SOVETSKAYA TORGOVLYA in Russian ("The Electronic 'Bookkeeper'") 19 Nov 77 p 2

KANISHCHEV, V., chief bookkeeper

[Abstract] The wholesale trade office of sports and household goods of Rospotrebsoyuz [Union of Consumers' Societies of the RSFSR] was the first in the RSFSR consumers' cooperative system to convert to automated bookkeeping. It was aided in the resolution of this complex task by the computer center of the Riga Wholesale Trade Office of Latpotrebsoyuz [probably Latvian Union of Consumers' Societies] and Tsentrosoyuz [Central Union of Consumers' Societies of the USSR]. As a result of their collective labor, the "bookkeeping" subsystem successfully underwent experimental operation, and for the first time the balance was compiled completely on the Minsk-32 computer, as well as being finished 6 days in advance of the usual time.

The automation of calculations allowed a 30 percent reduction in the book-keeping staff and a consequent savings of 20,000 rubles per year, while at the same time the accountants' productivity rose sharply. For example, shelf inventory can now be taken in half the time, and the commercial service unit can receive operational data on the availability and assortment of merchandise on the shelves every 5 days.

USSR

CREATION OF AUTOMATED SYSTEM OF SCIENTIFIC AND TECHNICAL INFORMATION

PIROGOV, YU., Chief, Division of TSNIINTEItogovli [Central Scientific-Research Institute for Scientific, Technical and Economic Information on Trade] Candidate in Technical Sciences, and VOINOV, V., Senior scientific research worker TSNIINTEItorgovli

[Abstract] The authors' institute is currently developing the ASNTI [automated system of scientific and technical information] to be used in Soviet trade. The ASNTI of the Trade Ministry, in cooperation with the systems of other ministries and departments, is to become a part of the YECNTI [unified system of scientific and technical information] of the nation, based on the use of machine methods for retrieval, processing, duplication, publication, transmission and storage of information materials. The system is based on the following principles: complete automation of all functions; unification of information offices in the branch at various hierarchical levels and customized information servicing of consumers at each level; flexability to allow improvement and development; 1-time input and processing of documents, with the possibility of repeated output and use; satisfaction of both current and potential future requirements for information. TSNIINTEItogovli, equipped with a YeS 1020 computer, will be at the top of the system; the second level includes seven specialized information centers; the third level is represented by the information organs of the ministries of trade of each union republic; below these ministries will be local information retrieval systems using computers or tabulating equipment; the fourth level, still lower, will consist of oblast, city and kray administrations, as well as large enterprises and organizations in the branch. A single information retrieval language will be used at all levels. Anticipated savings resulting from introduction of the ASNTI amount to 300,000 rubles per year, so that the cost of creation of the system will be amortized in 2.5 years.

USSR

FUNCTIONAL STRUCTURE OF THE AUTOMATIC MANAGEMENT SYSTEM OF STROYBANK ESTAB-
LISHMENTS

SOKOLOV, G. M., candidate in economic sciences, and ROMANOV, A. A., candidate
in technical sciences

[Abstract] Creation of the "ASU-Stroybank" [Automatic Management System—
All-Union Bank] for the Financing of Capital Investments] began in the Ninth
Five-Year Plan. Introduction of an ASU in connection with financing and ex-
tending a credit for capital investments proved to be feasible if the system
were based on third-generation computers and remote multichannel servicing
of subscribers via video terminals. Today the functional part of the oblast
(city) level of the system (now under design in the Computer Center of the
Moscow City Office of the ASU-Stroybank has these subsystems: 1) Financial
software for capital investments; 2) Credit-granting to contracting organiza-
tions; 3) Accounting and recordkeeping; and 4) Economic analysis of capital
construction. Each subsystem's function is described. Tests to be met be-
fore a project is accepted as a Stroybank establishment are outlined.

Q. Agriculture, Water Management, Land Reclamation, Sylviculture

USSR

EXPERIMENTAL COMPUTERIZATION OF AGRICULTURE IN CONCLUDING PHASE

Baku VYSHKA in Russian ("Experiment Requires Attention") 11 Jan 77 p 2

PODPALYY, A., engineer, Tauz

[Abstract] Introduction of computer technology into the agricultural collective of the Azerbaydzhan affiliate of the All-Union State Planning and Technological Institute (VGPTI) for Mechanization of Accounting and Calculating Machines of the USSR Central Statistical Administration is being accomplished. The development by VGPTI of a plan for complex mechanization of bookkeeping for agricultural enterprises permitted the establishment in 1971 of an experimental region of complete mechanization in Tauzskiy Rayon, mainly in viniculture. Today the Tauz experiment has entered the concluding phase, but the questions advanced by it have not been solved or found reflection in the activity of all those concerned. It is still necessary to generalize the work experience of the best collectives, to analyze it and spread it in the region, as well as to determine the economic effect which the plan has brought to the region.

USSR

NEW BUILDING IS CONSTRUCTED FOR TIME-SHARING COMPUTER CENTER

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ("New Computer Home") 2 Jun 77 p 2

KAZAKOV, V., correspondent of SOTSIALISTICHESKAYA INDUSTRIYA, Kishinev

[Text] A new building has been constructed to house a collective-use computer center in Kishinev. It serves the Moldavian Ministry of the Food Industry and the republic agricultural-industrial corporations "Moldvinprom" [Moldevian Wine Industry] and "Moldplodoovoschoprom" [Moldavian Fruit and Vegetable Industry]. For the electronic machines in the building there is a hall occupying a thousand square meters, and special rooms have been equipped for programmers, developers, and operators.

The new working conditions will enable the associates of the computer center to solve twice as many problems as before.

USSR

COMPUTERIZED AGRICULTURAL PLANNING

ARKHIPOV, P., director, Information Computing Center, Ministry of Agriculture, Latvian SSR, Candidate in Economical Sciences

[Abstract] Existing methods of economical analysis and planning can no longer satisfy the needs of kolkhozes and sovkhozes, which makes it necessary to resort to computerized economical mathematical methods. The IVTs [Information Computing Center] of the Ministry of Agriculture of the Latvian SSR, together with the Institute of Economics of the Academy of Sciences, Latvian SSR have developed an automatic system of planning estimates (ASPR) in agriculture. The first stage of the ASPR system for long-range, current and operational planning has already been introduced. The ASPR long-range planning makes it possible to calculate 10 variants of the plan. The criteria of optimization can be estimated according to the maximum net profit, maximum gross revenue, minimum production outlays, etc. The IVTs have developed a research system for a centralized conditional-constant accumulation of information from annual reports of kolkhozes and sovkhozes. Beginning with 1971 almost 3,000 indices of the annual activity of every sovkhoz and kolkhoz in Latvia were recorded on magnetic tapes. The variable information, such as cropping capacity, cattle productivity, etc., requires a scientifically-substantiated approach. Four factors are used in forecasting cropping capacity: the quality of arable land, availability of principal plant-raising funds, amounts of fertilizer applied, and labor outlays in plant growing. The degree of the effect of each factor on the cropping capacity was determined from the aggregate of these indices in kolkhozes and sovkhozes in accordance with the soil-climatic zone. The computer estimates showed that cropping capacity of cereals forecast in this manner for 1977 may be taken as a standard in planning. However, in some farms the rated cropping capacity for 1977 proved to be somewhat lower than the actual one in 1976, which means that the above method does not take into account a number of subjective factors such as the level of management, farmining efficiency and others. The IVTs has also developed and introduced optimum rations for cattle. Last winter the Latvian Agricultural Academy worked out standard computerized rations for 118 kolkhozes and sovkhozes. These estimates of rations are also useful for workers of the combined-fodder industry. The fleet of tractors and machinery in kolkhozes and sovkhozes increases and its technical and economical efficiency is enhanced. During the present five-year plan the second stage of ASPR will be put into operation. However, the efficient functioning of the system cannot be ensured until the Ministry of Agriculture and other ministries establish proper standards for planning the agricultural economy.

III. SOCIOCULTURAL AND PSYCHOLOGICAL PROBLEMS
        E. Education

USSR

NEW INSTRUCTION COMPLEX/COMPUTER CENTER AT POLYTECHNICAL INSTITUTE

Leningrad VECHERNIY LENINGRAD in Russian 15 Sep 77 p

ISACHENKO, O.

[Abstract] According to the article, a new complex of classroom and auxiliary buildings will soon be erected at the Polytechnical Institute imeni Kalinin. An instructional computer center and telecenter are included in the plans.

USSR

THE USE OF COMPUTERS IN THE UNIVERSITY

Moscow VESTNIK VYSSHEY SHKOLY in Russian ("Using Computers") No 9, Sep 77 pp 41-45

FILIMONOV, A. A., candidate in technical sciences, dotsent, and RUNOV, N. A., Pushkino Higher Command School of Radio Electronics, PBO [air defense]

[Abstract] In order to increase the throughput capacity of computers used to teach programming, the Pushkino Higher Command School of Radio Electronics has set up a classroom for AKP [automated class of programming], utilizing a time-shared "Dnepr" electronic computer with extensive software, 15 remote control terminals, 1 instructor's control terminal, an interface between the remote control terminals and the computer, plus the required software, programmed texts, filmstrips and other instructional materials. A flow chart is presented of the overall program for instruction of students and a general description is given of a method for using the classroom. Students complete the programming course more rapidly in the automated classroom and achieve better test scores than when a human instructor is used. Figure 1; tables 2.

USSR

CYBERNETICS INSTITUTE TO ASSIST TRAINING OF DOSAAF PERSONNEL

Moscow SOVETSKIY PATRIOT in Russian ("In Unity With Practice") 12 Oct 77 p 2

STOGNIY, A., corresponding member of the Academy of Sciences Ukrainian SSR, Kiev

[Abstract] The Institute of Cybernetics of the Academy of Sciences Ukrainian SSR is contributing to the work of the Volunteer Society for Assistance to the Army, Air Force and Navy (DOSAAF). As an example, the institute is currently working on the establishment of an experimental republic educational-methods center for DOSAAF which will serve as the base for a network of local DOSAAF educational organizations. In addition, a conference was held recently at which the institute's scientists and leaders from the Central Committee of the Ukrainian DOSAAF discussed the status of and prospects for automation of education and training in the DOSAAF system. At this conference Candidates in Technical Sciences A. Dovgyalo, B. Platonov, N. Radomskiy and other associates of the Laboratory for Dialogue Teaching Systems presented a rough draft of an original design for the above-mentioned experimental center. They also reported on the progress of efforts to develop a computer-based system for automated training of operators of radar stations and radiotelegraphers.
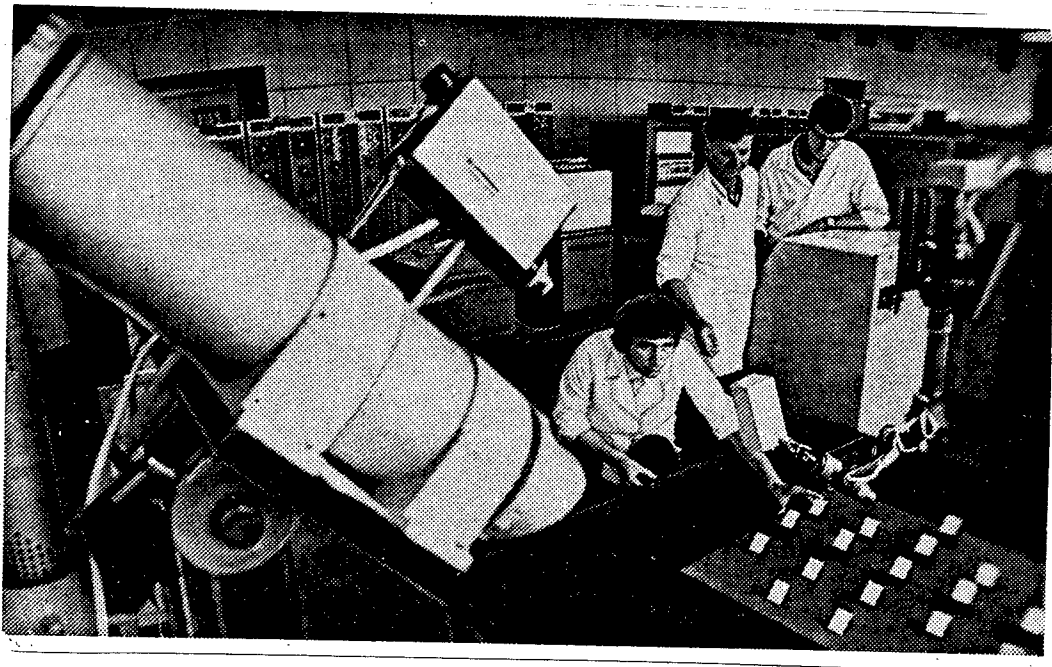
J. Artificial Intelligence

[Text] The staff of the Laboratory of Problems of Modeling of the Institute of Cybernetics, Academy of Sciences Ukrainian SSR, is working on the creation of robots of the "eye-hand" type.

In the photograph: senior engineer V. Dzyuba, director of the group V. Krot, and engineer A. Bogdanchenko.

IV. NATURAL SCIENCE RESEARCH
A. Biology and Medicine

USSR

THE "ISKRA-1256" MEDICAL DIAGNOSTIC COMPUTER

Leningrad VECHERNIY LENINGRAD in Russian 13 Sep 77 p 2

FEDOROV, S.

[Text] Associates of the Computer Design Bureau began preparing the "Iskra-1256" keyboard computer for state testing today.

The "Iskra-1256" specializes in medical diagnosis and is designed for processing statistical data gathered by physicians. The computer will be installed in scientific research centers and is planned for use in various branches of the medical sciences. Simultaneously, designers have begun planning an electronic diagnostic apparatus to be installed at clinics.

USSR

COMPUTER PERFORMS DIAGNOSIS

Moscow IZVESTIYA in Russian ("Electronic Computer Performs Diagnosis. A Broader Path for Novelties in Medical Technology"), 20 Nov 77 p 4

BOGORAZ, A., and SABIROV, A., Special correspondents for Izvestiya

[Excerpts] Specialists in the countries of the Council for Mutual Economic Aid [CMEA] are now occupied with the development of a unified system of electronic medical diagnosis apparatus. This apparatus will be composed of standardized elements. And it means that in the future the time for developing novelties will be shortened and their assimilation by the manufacturing industry will be accelerated. Equipment will become more reliable and will be simpler to service.

Not long ago in Kazan an exhibition was held of the work of engineers of the CMEA countries. Designers are now working on the creation of electronic complexes coupled with computers.

It seems not long ago that the only "technology" in a doctor's equipment was the stethoscope. Now modern portable diagnostic devices come to the aid of medical personnel. Hungarian designers have produced a portable diagnostic complex to help the doctor. In it there is a convenient arrangement of instruments making it possible rapidly to check the patient's hearing, take his temperature and blood pressure and take the characteristics of respiration and cardio- and encephalograms. Instruments of the firms "Medikor" (Hungary) and "Varimeks" (Poland) enable the "first aid" physician to see the ECG curve right at the scene of the accident and depending upon this to take any urgent

measures to save the victim. Soviet specialists have designed for the support of the "Salyut" portable cardiograph a new even more miniaturized "Foton."

With the aid of the Soviet systems "Volna" and "Telefon" or the Bulgarian "Telekard" the cardiogram can be transmitted from the scene of the accident by telephone to the consultation point at a medical institution. But can its interpretation be entrusted to an automatic machine? It can. Soviet engineers have designed a "Diagnoz" device. According to the cardiogram received by telephone or radio communication, after two or three minutes the computer gives the conclusion: "myocardial infarction... lateral front... acute stage..." Such apparatus have already been tested in the "first aid" stations of Moscow and Leningrad. Industry has already proceeded to mass produce them.

It is important to emphasize that a number of new Soviet diagnostic instruments are already made from standardized elements. Such, for example, is the family of diagnostic automats intended for studying the activity of the cardiovascular system, respiratory organs, etc.

At times it is very important for the physician to know the rate of blood flow in the patient's vessels. According to its variations it is possible, for example, to judge the formation of thrombi. An instrument created by Soviet engineers determines the rate of blood flow perfectly painlessly for the patient and insures automation of measurements and their high accuracy. With the aid of this apparatus which has received the name "Levkoy" there has been studied, for example, the blood circulation of astronauts under flight conditions.

By joint efforts the specialists of Soviet countries are creating a number of electronic diagnostic complexes. As an example, designers from East Germany, Hungary and Czechoslovakia collaborated in the development of a general-purpose complex for automated observation of seriously ill patients. The electronic instruments they created make it possible to constantly follow the condition of the patients.

After having been to the expositions of medical technology and becoming acquainted with the novelties one thinks how high human thought can reach and how the capabilities of medical technology have grown. Now it has become high time to introduce this technology into preventive and curative practice. The most important of the problems is rapid organization of large-scale production.

Another important problem is training personnel. In the programs of the medical schools and colleges there is still no department devoted to the latest achievements in electronic diagnostic technology. It is needed, however, so that future doctors and urses will receive experience in handling modern medical apparatus.

VI. THEORETICAL FOUNDATIONS
B. Automatic Control and Control Systems

USSR

A SEMINAR SCHOOL ON STRUCTURAL ADAPTATION OF COMPLEX CONTROL SYSTEMS

Leningrad IZV. VUZ: PRIBOROSTROYENIYE in Russian No 4, 1977 p 132

RASSTRIGIN, L. A., FROLOV, V. N., and L'VOVICH, YA. YE.

[Text] A seminar school on structural adaptation of complex control systems, organized by the scientific council on the complex problem of cybernetics under the Presidium of the USSR Academy of Sciences and the Voronezh Polytechnical Institute was held 8-14 February 1977 at Voronezh. Some 80 representatives of scientific organizations and higher educational institutions from Moscow, Voronezh, Riga, Leningrad, Kiev, Khar'kov and many other cities took part in the seminar. Nine lectures and 35 reports were heard, discussions were held and resolutions adopted.

Parametric adaptation, which has been widely developed in recent years, does not allow effective solution of many structural-type problems which arise in the process of adaptation in complex systems. The initial uncertainty of the object of control and its medium is frequently so great that parametrization leads to an extremely complex multiple-extreme problem of optimization, effective solution of which is practically impossible. This forces return to adaptation of the structure of the object. There are several approaches to the solution of this problem. They include methods of evolutionary modeling and multiple-alternative selection, developed at the present time. However, they do not exhaust the problem and there is an acute need for the development of new methods of structural adaptation.

The lectures and reports of the seminar school can be divided into two groups. The first group included theoretical problems of evolutionary modeling as a method of synthesis of structural models in the process of evolutionary structural adaptation, multiple-alternative selection, philosophical aspects of the methodology of modeling of structural categories. A number of reports were dedicated to the use of the method of randomization for the solution of problems of structural adaptation, related to decision making with respect to many criteria and in a discrete set.

The works of the second group were of an applied nature. They analyzed problems of the application of methods of structural adaptation in the construction of the algorithmic software of an automated management system, optimization of computer networks and the electronic hardware used, and automation of planning in medical cybernetics problems.

The seminar school noted the pressing nature of the problems of structural adaptation of complex control systems and acknowledged the desirability of regular conduct of seminars on this problem.

USSR

SYNTHESIS OF COMPUTER NETWORKS FOR HIERARCHICAL CONTROL SYSTEMS. I.

BOBER, V. I., STOLYAROV, B. A., ETTINGER, B. YA., and YANBYKH, G. F. (Riga)

[Abstract] The experience of the work of the authors in Riga on the develop-
ment of an automated management system [ASU] is discussed. The principles of
the combined approach to the problems of synthesis of the optimal topology of
a network of computer systems for a branch ASU are presented. A hierarchical
system of models is suggested for such tasks as analysis and optimization of
the network of computer centers. Mathematical modeling models of the function-
ing of the hardware are described. The suggested topology involves the use
of a combined computer and communication center in each region, connected,
partially directly and partially through switching centers, with subscribers'
peripheral complexes. The computer centers are also interconnected with each
other, either directly or through the switching centers at other computer
centers. Figures 2; references 16 (Russian).

USSR   UDC 658.012.011.56.001

ASPECTS OF THE CREATION OF AUTOMATED ENTERPRISE MANAGEMENT SYSTEMS BASED ON
THIRD-GENERATION COMPUTERS

SEDEGOV, R. S., ALEKHNOVICH, A. V., candidates in economic sciences, and
POCHANIN, YU. S., candidate in technical sciences

[Abstract] The transition to the use of third-generation computers makes it
possible to create much more complex ASUP [automated enterprise management
systems] than previously and requires a different approach to the creation
of such systems, based on the selection of directions of automation with dif-
ferent functions, resources and periods. These are set in a complex purpose
program in which the goals and means of achieving them are balanced and specif-
ic functions connected with organizational control are assigned to certain
subsystems of the ASUP. In addition to the usual subsystems for technical
and economic planning, management of the technical preparation of production,
operating management of the main production, management of material and equip-
ment supply and sales management, there also are subsystems for the manage-
ment of auxiliary production, assets management, forecasting and tasks solved
by methods of mathematical economics. Practically all operations assuring
and accompanying transfers of product between shops, accomplished by third-
generation computers on a time scale close to real with magnetic discs and
modern peripheral equipment, are included in the system. Figures 2.

USSR

TOPOLOGICAL SYNTHESIS OF COMPUTER NETWORKS FOR HIERARCHICAL CONTROL SYSTEMS. II.

BOBER, V. I., STOLYAROV, B. A., ETTINGER, B. YA., and YANBYKH, G. F. (Riga)

[Abstract] This work is a continuation of an article in the above journal (No 2, Mar/Apr 77 pp 130-136). It continues the presentation of the theoretical principles of a combined approach to the problem of synthesis of optimal computer center network topologies for hierarchical automated management systems by describing the development of mathematical models for optimal placement of computer centers, models for the supply of memory devices and reproduction of information files, as well as models of the selection of optimal structures of subscriber centralized data transmission networks and main line distributing networks for data transmission. The methodology suggested for solution of the problem of synthesis of an efficient structure for a branch computer center has been used in the development of the structure of the information and computer network of the Civil Aviation Service. Subdivision of the overall problem allowed the primary tasks involved in synthesis to be performed using actual input data on second and third generation computers. Figures 2; references 10 (Russian).

USSR   UDC 681.32:621.378

A CONTROL SYSTEM FOR EXPERIMENTAL STUDIES OF HOLOGRAM MEMORY UNITS

MANTUSH, T. N., and TARASOV, A. V. (Novosibirsk)

[Abstract] A description is presented of a control system for the M-400 minicomputer, used during experimental investigation of holographic memory systems at the IAiE [Institute of Automatic Control and Electrometry], Siberian Department, Academy of Sciences, USSR. The control system is intended to work with an address-type holographic memory unit with a capacity of 10^8-10^9 bits, providing for automatic selection of any assigned file of information in ROM, page reading and input to main memory, accuracy testing and error diagnosis. Data are addressed by means of 256 sectors (each sector being a hologram matrix) and 1024 pages (holograms) in each sector. Each page has the capacity of 1024 bits. Pages are read in their entirety and introduced into the computer sequentially. The composition and structure of the control system are

diagrammed and briefly explained. The operating mode of the system is illustrated. The system is stated to be easily expandable with respect to its functional potentialities, e.g., by the introduction of raw operating conditions, enlargement of the set of ordinary test configuration of data, etc. Figures 3; references 9: 7 Russian, 2 Western.

C. Game Theory and Operations Research

USSR   UDC 681.34

DEVELOPMENT OF METHODS AND MEANS FOR ANALOG DIGITAL MODELING OF SYSTEMS IN
UZBEKISTAN

BEKMURATOV, T. F., Order of Red Banner of Labor Institute of Cybernetics with
Calculating Center, Academy of Sciences, UzSSR

[Abstract] Analog-digital modeling of industrial objects has developed in
several directions. Each direction corresponds to a different type of ana-
log-digital computer: 1) Universal analog and digital computers with well
developed communications systems between them (complexes); 2) Universal ana-
log computers coupled with specialized digital machines designed to control
the analog machine or to perform special computations; 3) Universal digital
machines with specialized analog processors; 4) Devices with digital repre-
sentation of information and analog processing; and 5) Devices with combined
forms of representation of initial variables and computation results. Types
of machines in use in Uzbekistan are reported. The latest machine is the
ATSVS-2, consisting of a Dnepr-1 digital computer, an MN-18 analog computer,
two MN-7 analog computers and communications devices. This system can solve
systems of nonlinear differential equations up to 30th order; mathematically
model several systems simultaneously; automatically select and adjust parame-
ters of models; automate scientific experiments; and process imitation models
of systems, finding the optimal algorithms for identification and control of
the systems. This complex has been used to develop a number of hybrid methods
and algorithms for identification and control of linear and nonlinear dynamic
objects, based on representation of the models as functional Volterra series.
At the present time, research is under way on further development of methods
of computerized information form converters, automation of the planning of
analog-digital systems and computerized converters, hybrid algorithms for
identification and control and the creation of systems and applied digital
computer system software. The work described was fulfilled in close collabora-
tion with large scientific centers in this field: Institution of Control
Problems (Moscow), Institute of Cybernetics and Electronics, Academy of Sci-
ences, UkrSSR (Kiev) and the Leningrad Electrotechnical Institute imeni V. I.
Ul'yanov (Lenin). References 27 (Russian).

ANALYSIS OF VERSIONS OF ORGANIZATION OF MULTIMACHINE COMPUTER CENTERS IN AUTO-
MATED QUEUEING SYSTEMS WITH RELIABILITY CONSIDERED

VISHNEVSKIY, V. M., REBORTOVICH, B. I., and TIMOKHOVA, T. A. (Moscow)

[Abstract] Characteristics of redundant queueing systems with unreliable
servicing devices are determined. Examples are presented of the use of the
results produced for the design of multimachine computer centers. The char-
acteristics of servicing of requests are analyzed for three different types
of multimachine computer centers: a center with two machines, in which one
is always in reserve while the other handles the entire flow; a center with
two machines, each of which handles half of the flow, so that servicing of
half of the flow is interrupted if one of the machines fails; and a center
with three machines, two handling half of the flow each while the third is in
reserve in the event of failure of either of the two primary machines. Fig-
ures 2; references 3 (Russian).

USSR   UDC 519.2:681.3

ONE MODEL OF DISTRIBUTION OF THE RESOURCES IN AN OPERATING FIELD OF A HOMOGENE-
OUS COMPUTER SYSTEM

TAFT, V. V.

[Abstract] A study is made of a computer system designed for parallel pro-
cessing in which an operating field consisting of a set of identical elements
called zones is used in place of independent processors. In the programs
which are run, parts (branches) are selected which can be run in parallel.
An instruction in the system consists of a set of various operations of a
single branch which are performed simultaneously. Depending on the type and
number of operations, instructions require various numbers of zones in the
operating field. The operation of the system is cycled. Several instructions
in different branches can be carried out in a single cycle. Thus, whereas in
a single processor system a single instruction address counter operates, in
the homogeneous computer system analyzed here, there may be several such
registers (called request sources). In planning homogeneous computer systems
of this type, the problem arises of selecting the minimum necessary number
of request sources assuring effective utilization of the operating field con-
sisting of a given number of zones. A model is analyzed for selection of
this number. In the case when redistribution of resources is performed by
cycling, the model described may also be of interest for the selection of the
level of multiprogramming both for multiprocessor and for multiprogramming
single-processor computer systems (process of distribution of main memory
among jobs). References 3: 2 Russian, 1 Western.

VII. GENERAL INFORMATION
A. Conferences

USSR

LENINGRAD CONFERENCE ON AUTOMATED MANAGEMENT SYSTEMS

Moscow PRAVDA in Russian ("The Computer In the Service of Technologists")
30 Oct 77 p 2

[Text] Nearly 300 representatives of Leningrad associations and enterprises took part in a two-day seminar on experimental development and introduction of automated management systems [ASU] for technological processes. It took place at the House of Scientific-Technical Propaganda. Scientists from Leningrad institutes and leading specialists in the field of automated production processes gave reports and lectures at the conference.

Professor N. A. Boborykin, doctor of technical sciences and head of a faculty of Leningrad Institute For Methods Of Technical Management, devoted his presentation to analysis of the factors determining the economic effectiveness of automated lines of machine tools and aggregates with numeric program control. V. I. Yureva spoke about the first results of operations of the ASU "Electroliz" at the Volkhovskiy Aluminum Plant. Topics of discussion at the seminar included experiments in automation of technological processes in such branches of industry as cellulose, clay-earth, oil refining, cement, and others.

At the seminar recommendations were accepted for long-range heightening of the effectiveness and expansion of the fields of application of ASU in technological processes.

USSR

COLLABORATION WITH BULGARIAN SCIENTISTS

Minsk SOVETSKAYA BELORUSSIYA in Russian ("Along the Road of Collaboration")
11 Nov 77 p 4

[Text] A delegation of Bulgarian scientists headed by the president of the Bulgarian Academy of Sciences, Angel' Balevskiy, is visiting our republic. On 10 November they met with members of the presidium of the Belorussian Academy of Sciences [AN BSSR]. In an informal conversation, the president of the AN BSSR, N. A. Borisevich, spoke about the republic's experience in organizing scientific-research work and of its vast program for collaboration with scientists of many countries. Colleagues from our sister country, Bulgaria, shared their achievements and discussed their work with Belorussian researchers.

The closest collaboration took place in the field of technical cybernetics. A great deal of progress was made towards the creation of automated systems for long-distance data processing and for design, construction and technological

developments in industry and building.

Scientists from the AN BSSR Heat and Mass Exchange Institute and Institute
of Solid State Physics, Bulgarian Academy of Sciences, are working on the
creation of new materials for energy-related needs. They are collaborating
on the development of effective methods for converting solar, chemical, wind
and geothermal energy into electrical, thermal, and mechanical energy. We
already have the first fruits of our scientific search--reliable and economi-
cal equipment and plants have been constructed.

During the latter part of the day the guests visted the Belorussian Academy
of Sciences Institutes of Physics and Technical Cybernetics as well as the
Central Design Bureau with its Experimental Plant.

On 11 November the Bulgarian guests will continue their acquaintance with
the work of the scientific organizations of our republic.

USSR

SEVENTH ALL-UNION CONFERENCE ON MANAGEMENT PROBLEMS

Minsk SOVETSKAYA BELORUSSIYA in Russian ("Science To Control") 25 Nov 77 p 2

[Text] The work of the Seventh All-Union Conference on Management Problems
is continuing in Minsk. A wide variety of issues on the given topic which
have actual theoretical and practical significance for the realization of
the directives of the 25th Party Congress on the improvement of all control
mechanism components are being discussed in the plenary and sectional con-
ference sessions.

Great interest of the conference participants was aroused by reports and in-
formation on interaction between men and machines in control systems, the
application of computer technology to production and scientific research, de-
sign automation, robots and artificial intelligence. Much attention was given
to the practical use of the results of scientific research, to the introduc-
tion of automated management systems (ASU) in various branches of the national
economy, to increasing their reliability and to quality control.

At the first plenary sessions reports were given by the following: Academi-
cians B. N. Petrov; A. G. Aganbegyan, N. N. Krasovskiy; Ya. Z. Tsypkin, cor-
responding member of the USSR Academy of Sciences; and M. A. Ayzerman, doctor
in technical sciences.

On 23 November a group of prominent scientists--participants in the meeting,
headed by the Academician V. A. Trapeznikov, deputy chairman of the State
Committee for Science and Technology of the Council of Minsters USSR, Chairman
of the USSR National Committee on Automated Control, and Hero of Socialist

Labor--was received by the Tsk KPB [Central Committee of the Communist Party of Belorussia]. A conversation took place in which A. A. Smirnov, secretary of the TsK KPB, emphasized the importance of the problems discussed at the All-Union Conference and spoke about the work conducted in the republic on the improvement of forms and methods of management of socioeconomic processes in the light of the decisions of the 25th Party Congress.

Participants in the conversation exchanged opinions concerning important directions in the development of scientific research and the application of its results to increasing the effectiveness of social production and to the improvement of the quality of products manufactured. Also discussed were the integrated systems approach to the resolution of management problems, development of scientifically-based criteria for the assessment of the work of enterprises and managers at various levels, and methods of reducing the time for introduction of new technology, including contemporary means of management.

In conclusion A. A. Smirnov thanked the scientists from Moscow, Leningrad, Kiev and the country's other science centers for their considerable aid in the development of scientific research in the republic and expressed his certainty that the conducting of the All-Union Conference in Minsk will promote long-range development of management science and more effective utilization of resources and methods in the interest of successful resolution of the problems of communist construction.

The following scientists took part in the discussion: I. M. Glazkov, deputy chairman of the Belorussian SSR Council of Ministries; Yu. P. Smirnov, chief of the Division of Science and Educational Institutions of the TsK KPB; N. A. Borisevich, president of the Belorussian SSR Academy of Sciences, and others.

USSR

CONFERENCE ON AUTOMATED MANAGEMENT SYSTEMS

Minsk SOVETSKAYA BELORUSSIYA in Russian ("500 Problems Around The Computer") 26 Nov 77 p 3

[Abstract] Management problems were discussed at a 21-25 November conference in Minsk. Academician B. Petrov, participant in the conference and holder of the title of Hero of Socialist Labor, commented that soon various automated units, connected to a computer, will take as active a part in design bureaus as does a human engineer.

The first date on automation of planning of ASU [Automated Management Systems] have been obtained, and it is said that management systems are now heading towards unification and standardization of design.

It was stated that one advantage of ASU technology lay in freeing men from the necessity of doing heavy labor underground under unhealthy conditions.

B. Organizations

USSR

COMMITTEE OF SCIENTISTS ESTABLISHED

Tallin SOVETSKAYA ESTONIYA in Russian ("From the Idea to Its Introduction" and "Where Are the 'Hot Spots'?") 8 December 76 p 2

[Abstract] The newspaper Sovetskaya Estoniya has set up a committee of scientists to help the newspaper and its readers understand the problem of the effectiveness and the economic return of science in the republic. The members of the committee are: 1) Khanon Barabaner, secretary, Party Bureau, Institute of Thermophysics and Electrophysics, Academy of Sciences, Estonian SSR, Candidate in Economic Sciences; 2) Ants Byrk, deputy director, Institute of Cybernetics, Academy of Sciences, Estonian SSR, Candidate in Technical Sciences; 3) Olav Keerberg, head, Department of Physiology and Biochemistry of Plants, Institute of Experimental Biology, Academy of Sciences, Estonian SSR, Dr of Biological Sciences; 4) Eynar Klaamann, affiliation not given; 5) Koyt Leets, head, Department of Organic Synthesis, Institute of Chemistry, Academy of Sciences, Estonian SSR, Dr of Chemican Sciences; 6) Avo Miydel, scientific secretary, Institute of Geology, Academy of Sciences, Candidate in Geology-Mineral Sciences; and 7) Endel' Vitsur, secretary, Party Bureau, Institute of Economics, Academy of Sciences, Estonian SSR, Senior Scientific Worker of the Sector of the Economics of Industry. The committee is to discuss in the newspaper such problems as the meeting of the goals set forth by the 25th Party Congress, an increase of the efficiency of scientists and the interchange of ideas among institutes. The first discussion held by the committee was on "hot spots" of science, that is the stumbling blocks which hinder and delay the introduction into everyday life and production of good ideas developed at research institutes. These include the fact that the scientific research institute which develops an idea must also become involved in its practical application, so that highly trained scientists find themselves working as assemblers of circuits or machinery, rather than passing on the idea to a planning organization in order to draw up a working plan, and then to engineering personnel who actually assemble the hardware. Another stumbling block is the lack of an economic stimulus to cause scientific-research institutes to introduce ideas into practice. It is also suggested by the group that scientific-research institutes discuss their most pressing problems and latest ideas on the pages of the newspaper, in order to promote interchange of ideas and solutions.

C. Personalities

USSR

V. A. KOVALEVSKIY OBSERVES 50TH BIRTHDAY

Kiev KIBERNETIKA in Russian No 5, Sep/Oct 77 p 11

[Abstract] The article congratulates Vladimir Antonovich Kovalevskiy, Dr in Technical Sciences, on his 50th birthday, to be observed on 5 November 1977. He heads a department at the Cybernetics Institute of the Ukrainian SSR Academy of Sciences. He is cited as one of the USSR's leading specialists in the field of pattern recognition.

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